

Attributes can be either single-valued or multi-valued. A single-valued Attribute can only have a single value that applies to an Entity at any point in time (or, for a dynamic segmentation Attribute, at any point in time for any sub-section of the Entity). A multi-valued Attribute can have multiple values at any point in time. Each

5 Attribute is completely characterized by a number of Properties that define these differences between the Attributes. The following list describes Properties of Attributes that affect how Attribute data are stored and maintained:

- 10 **[0141] Attribute Name.** Each Attribute has a name that is unique within the Entity class to which the Attribute is associated. This Property specifies the name of an Attribute.
- [0142] Attribute Join Type.** Different Attributes are related to the parent Entity in different ways. For example, an Attribute might be stored directly in the parent Entity table or in an associated table. The Attribute Join Type identifies how an Attribute is related to its parent Entity.
- 15 **[0143] Table Name and Column Name.** Most TSAF Attributes are directly related to a specific column in a specific Application Table. For such an Attribute, these Properties specify the name of the table and the column in that table used to store the Attribute value. For a derived Attribute, the table name does not
- 20 apply and the column name specifies the alias name that will identify the derived values in a query result. For a calculated Attribute, these Properties indicate the table and column name in which the calculated value is stored.

**[0144] Geometry Type.** Some dynamic segmentation data may refer to linear events (e.g., pavement type) while others refer point events (e.g., pothole location). For a dynamic segmentation Attribute, this Property indicates whether the Attribute is a linear or a point Attribute. A table used to store point dynamic segmentation Attributes only requires a single offset column (Loc\_Pct). A table used to store linear dynamic segmentation Attributes requires two offset columns (Beg\_Pct and End\_Pct).

**[0145]** Point attributes cannot be single-valued. Point attributes can be stored in a table with linear dynamic segmentation attributes, in which case the point attribute applies at the Beg\_Pct offset.

**[0146] Location Type.** Dynamic segmentation allows TSAF to reference linear sub-sections along a Road or Division Section. However, some Attributes may refer to locations that are either sub-sections across a Road or Division Section or a position on a Road or Division Section. For example, a county line may run down the middle of a road, and half of the road should lie in each county. The location type Property differentiates between the following four types of dynamic segmentation location:

- [0147]** 1. A full location type indicates that an Attribute applies to the entire width of the Anchor/Road Section. For example, whether a road has limited access control applies to the road, not to a portion of the road. The prototype tables shown in Figure 17 assume the Attribute applies to the entire width, so they require no tuning if this option is selected.

**[0148]**        2.        A directional location type indicates that an Attribute may have a different value for each direction of travel. For example, a county line often runs down the middle of a county line road, in which case the two halves of the road (divided by direction of travel) are in different counties. In this case, the prototype table structure must be modified by adding a Direction column to the Attribute table.

**[0149]**        3.        A road position location type indicates that an Attribute refers to a position either on or beside the road. For example, a sign could be located at either side of a Road Division or overhead. In this case, the prototype table structure is modified by adding a Side column to the Attribute table.

**[0150]**        4.        A road-side position location type indicates that an Attribute refers to a position beside (but not on) the road. For example, a barrier could be located at either side of a Road Division, but not on the road itself. In this case, the prototype table structure is modified by adding a Side column to the Attribute table.

**[0151] History Type.** TSAF maintains a continuous historical archive of most Attribute values by date stamping rows in attribute tables. However, the historical archive may not be maintained for all Attributes. This Property indicates the type of historical information that is maintained for this Attribute by taking on one of the following three values:

**[0152]**        1.        No history indicates that no historical archive is maintained for the Attribute.